Implementing Innovative Technologies

A Field Perspective

Where we are

Where we want to be

Implementing Innovative Technologies

A Field Perspective

- **Focused initiatives are important**
- **DOD relies heavily on DOE and EPA's technology programs for funding to pilot innovative environmental technologies**
- **Installations frequently perform field-based "R&D" treatability studies and pilots to substantiate new technology performance**

Implementing Innovative Technologies

A Field Perspective

- **Uncertainty of funding precludes planning for new technology selection on existing sites**
  - *Funding towards compliance agreements, RODs, O & M*
  - *Difficult to reprogram funds to re-evaluate innovative technologies to increase effectiveness and decrease clean-up duration*
- **Capitalize on successes**
  - *Multi-site deployment AFCEEs national bioventing initiative worked!*
  - *NFESC's broad agency announcement*

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A Field Perspective

- **Provide staff assistance visits and incentives $$$**
  - *Evaluate technical feasibility*
  - *Peer review is not effective if implementation mechanism not provided*
  - *Offer incentives*
- **Provide awareness and training to front-line staff to enable them to change their daily practices**
  - *Tailor internet training seminars*

Implementing Innovative Technologies

A Field Perspective

Expand Cooperative agreements to gain regulatory consensus, demonstration, verification, certification and innovative cleanup technologies

Focused “field based” program with incentives for implementing pilot and treatability studies that result in significant cost savings & avoidance

Implementing Innovative Technologies

A Field Perspective

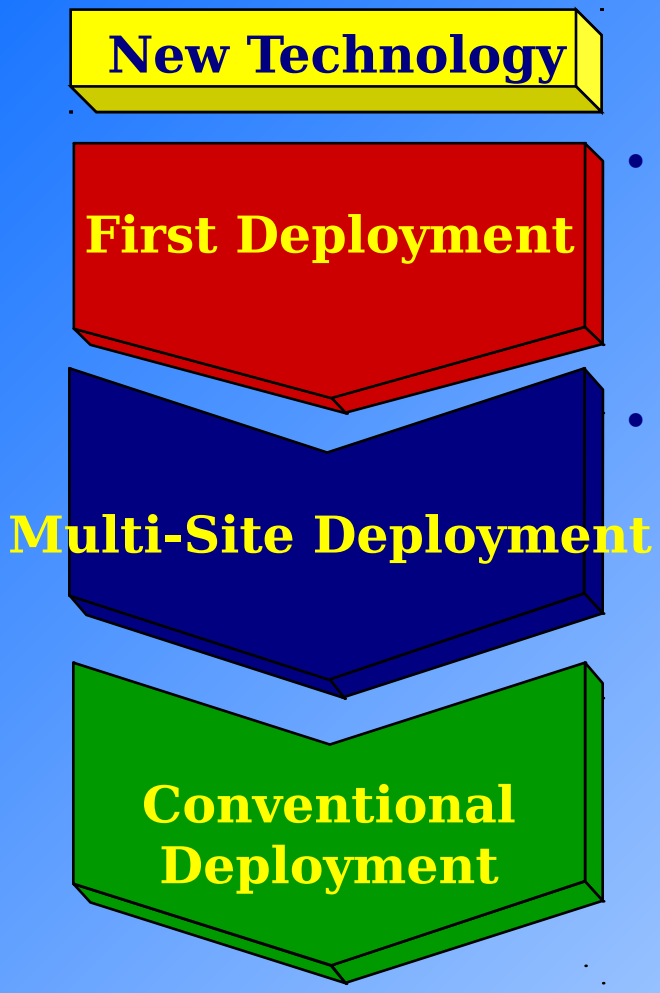
Expand Cooperative agreements to gain regulatory consensus, demonstration, verification, certification and innovative cleanup technologies

Use Existing Resources:

- **ESTCP/SERDP**
- **USACE Centers of Expertise**
- **Innovative Technology Advocates**

- **NFESC**
- **AFCEE**
- **RDTF**
- **ITRC**
- **EPA**

Implementing Innovative Technologies



A Field Perspective

ITRC Benefits

- **Reducing time for regulatory approval acceptance.**
  - **NJ - 20% savings staff review time**
  - **MA - 2 - 3 months time savings**
- **Increasing confidence to approve the technology and facilitating broader acceptance.**
  - **CO - Integrated the use of PRB into standard practices providing consistency and predictability leading to further time savings and economies of scale.**
  - **NY - led to routine use which contributed to a 2/3 reduction technology cost**

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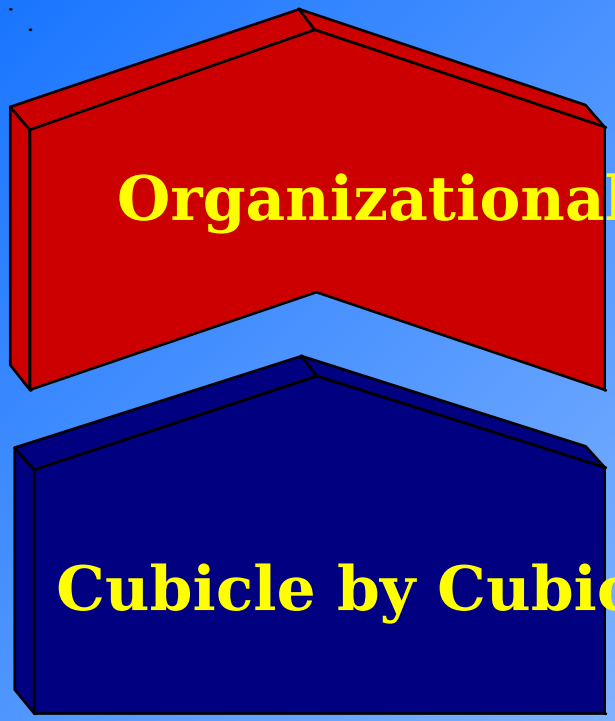
A Field Perspective



Institutional Change

Incorporate changes into the policies to institutionalize IT performance measurements into:

- **In progress reviews**
- **Personnel performance criteria**

"Making the use of innovative technologies change from an extraordinary occurrence to an ordinary practice." Rich Schlenker, NDEQ

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A Field Perspective

- **Individuals with initiative are leading the way - model their performance and decisions**

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A Field Perspective

Contractors/Consultants Issues:

- Reluctant to implement because use of IT may reduce field time, increase effectiveness, decreases project duration
- Risk- “Not conventional, tried and true”
- Increase incentives to recommend IT on characterization, monitoring and treatment technologies
- Diminish the philosophy “We tried it once and it doesn’t work” --leading to a categorical dismissal of technology for future projects
- Create a competitive climate for contractor selection that includes IT

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A Field Perspective

- ITAs reviewed program cost to complete estimates
  - **25% considered IT**
  - **Potential on additional 30% of projects**
- Typical IT
  - **Soil vapor extraction, air sparging, bioventing, natural attenuation, low temperature thermal desorption**
- Potential IT
  - **Ex-situ bioremediation, permeable reactive barrier walls, soil washing, soil heating, electrokinetic, steam, field based characterization, monitoring**

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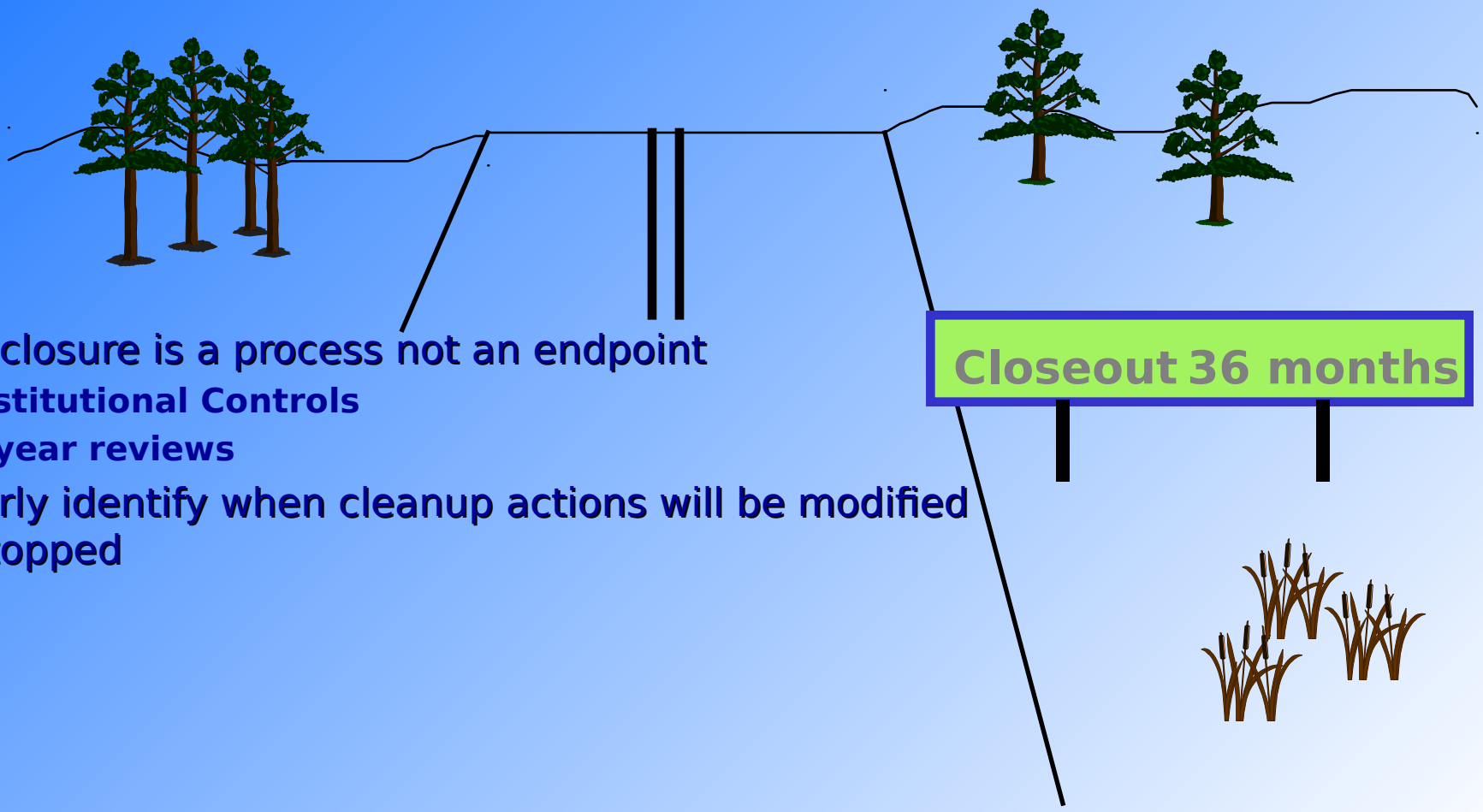
A Field Perspective



- Site closure is a process not an endpoint
  - **Institutional Controls**
  - **5-year reviews**
- Clearly identify when cleanup actions will be modified or stopped

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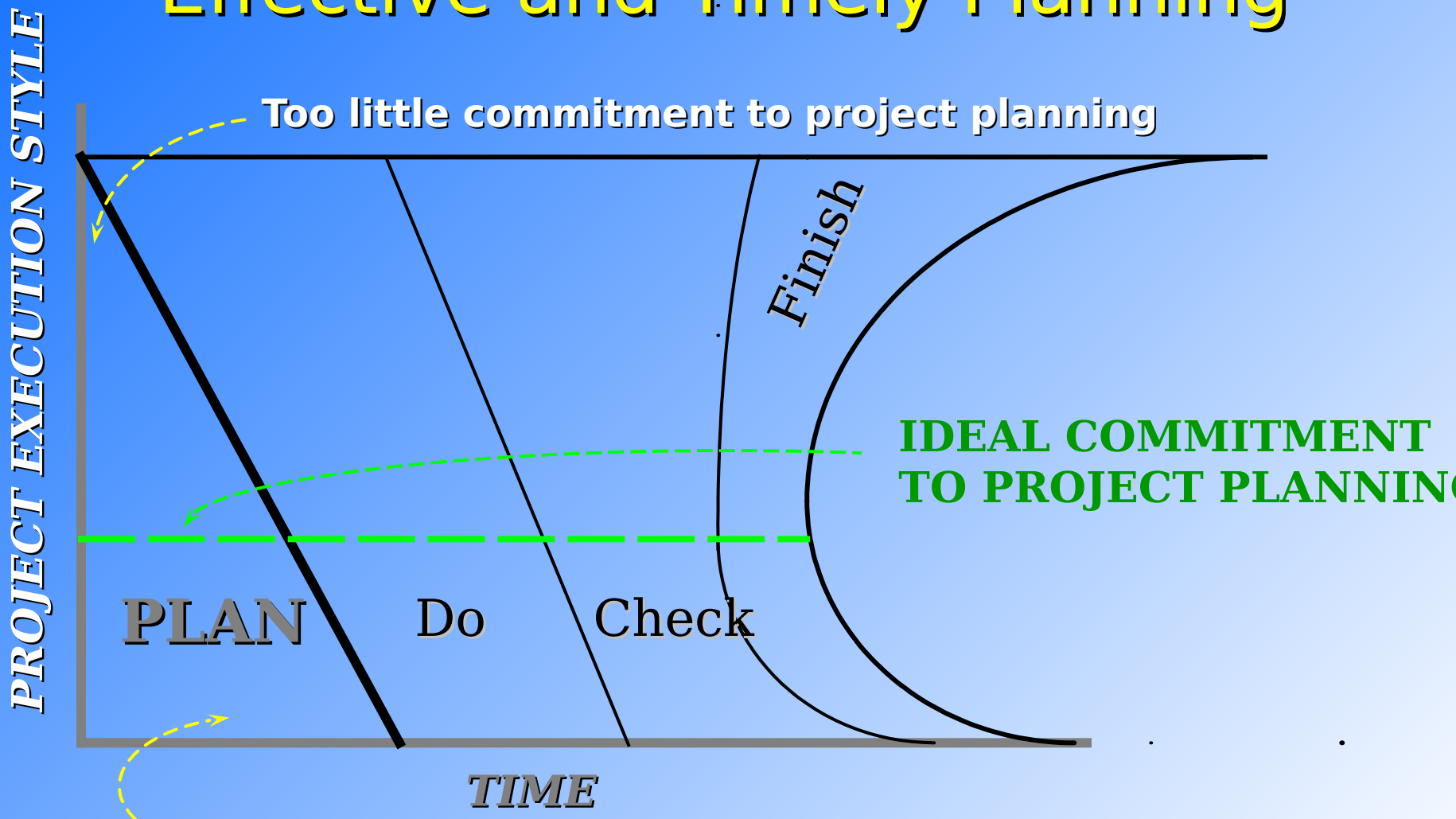
A Field Perspective

Expand Cooperative agreements to gain regulatory consensus, demonstration, verification, certification and innovative cleanup technologies

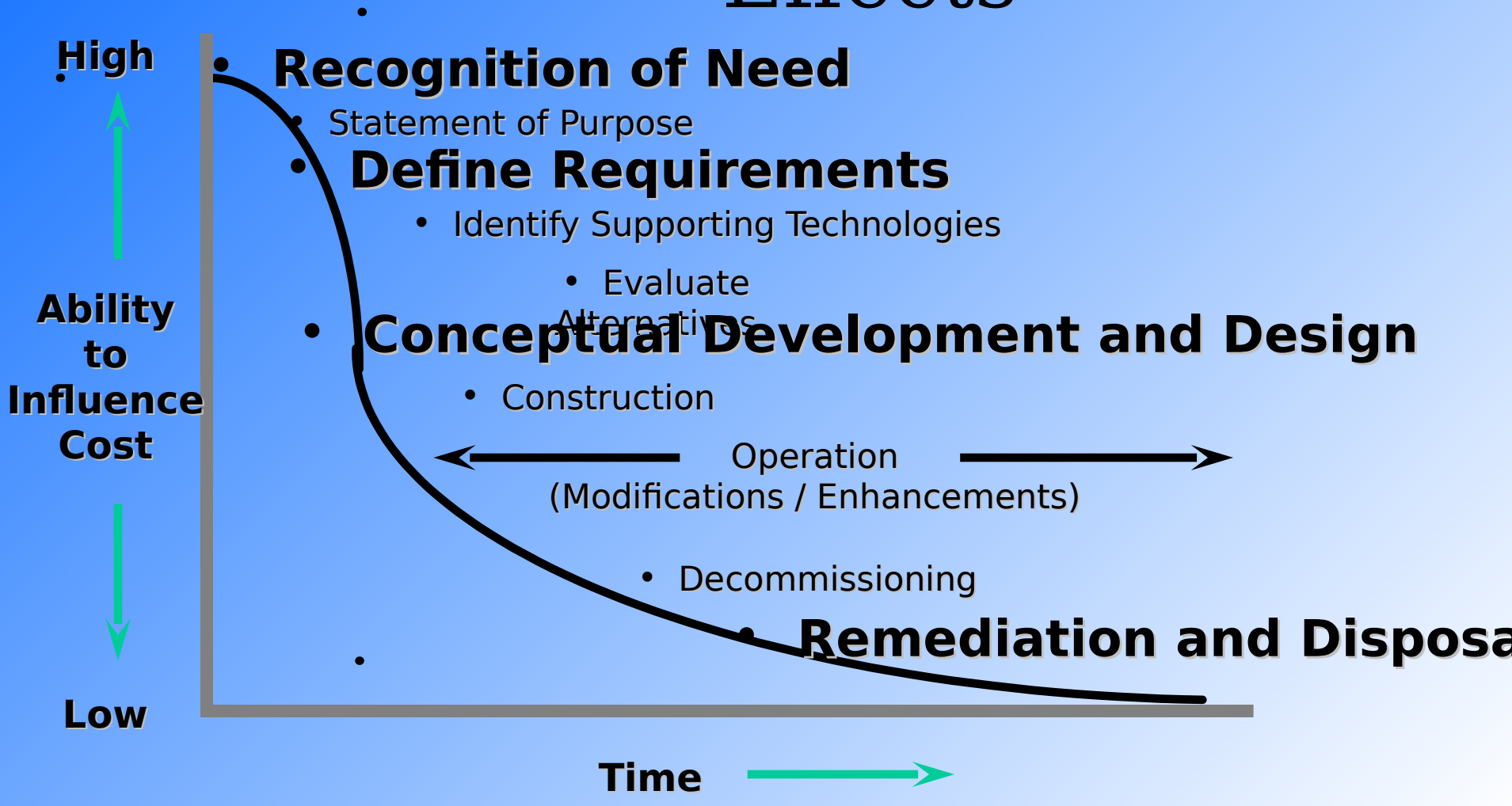
Systematic planning **for all site activities, ensuring that the end goals for each project are clearly identified**

- ***Value engineering***

Performance Management
Effective and Timely Planning



Management Ability to Impact Cost Effects



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A Field Perspective

- Feasibility Study
  - Focus attention away from technologies requiring significant O& M
  - Provide checklists to help identify capital and annual (O&M) costs and include in the cost estimate for a remedial action alternative
  - Focus on treatment of contaminant source
    - Foster initiatives - DNAPL Consortium

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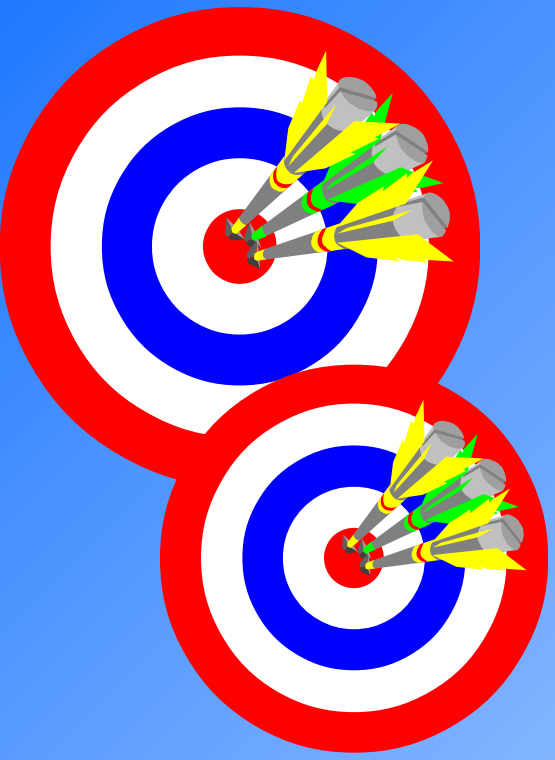
A Field Perspective



- Project performance is measured by:
  - **Budget execution, time**
  - **Baseline for comparison is a moving target**
- Innovative technologies selected when difficulties with conventional technology arise
- Need to incorporate life-cycle cost, technology treatment efficiency & effectiveness

Technology Performance Measurements

Remediation System Evaluation

- **Increasing Costs for Operation of Long-Term Remediation Systems**
- **Directives:**
  - **EPA 5-year Review Guidance**
  - **ACSIM Directive July 17, 1998**
- **Identify Approach to meet Directives, Minimize Costs, and Speed Site Closure - *If it isn't broke you can fix it!***

Performance Measurements
What and Why RSE's?

- **Low-Cost Rapid Assessment (15K -25K)**
- **Reduce O&M Costs**
- **Assure Clear Goals and Closure Criteria Exist**
- **Optimize System Performance**
- **Evaluate System Protectiveness (CERCLA 5 yr. Review, ACSIM Directive)**
- **Assure Adequate**

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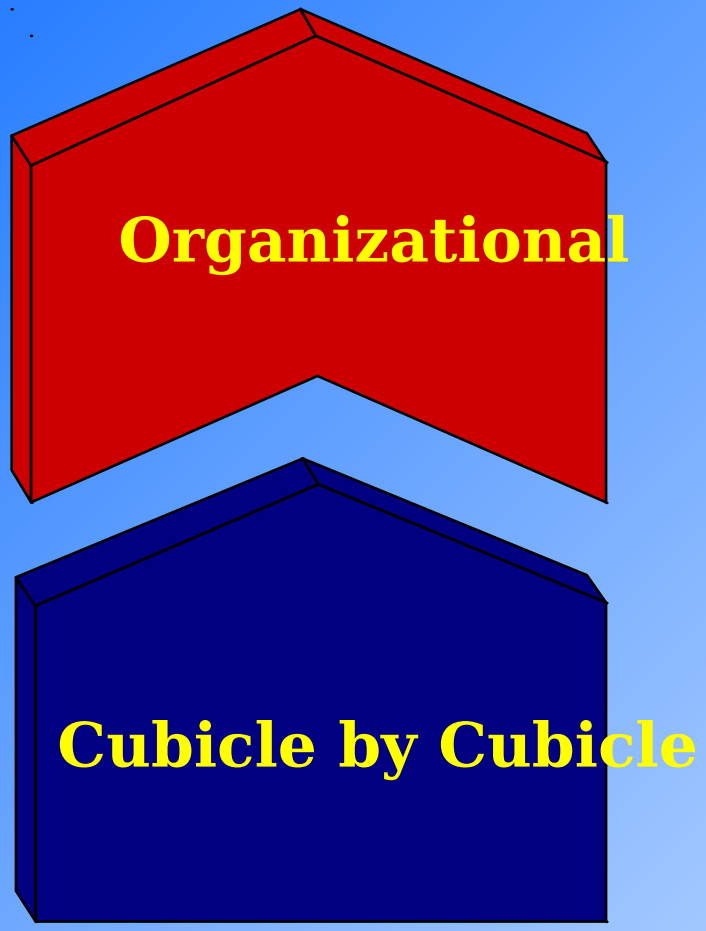

A Field Perspective

- Field Characterization and Long Term Monitoring
  - Institutionalize these newer approaches
  - Expect these principles will guide the way data is collected and analyzed during future site clean-up activities.

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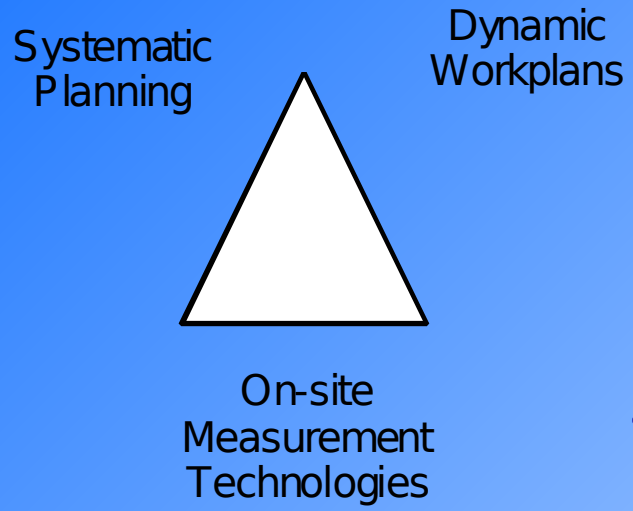
The "Triad"



A Field Perspective

- **Field measurement technologies provide results that are faster, less expensive, and at times provide results unobtainable with standard off-site methods**
- **Innovative characterization approaches and field measurement technologies can be used to overcome problems associated with accurately characterizing sites and optimizing remediation processes**

Implementing Innovative Technologies

A Field Perspective

Develop goals and performance measures for using innovative technology to support the DoD clean-up mission

Systematic planning **for all site activities, ensuring that the end goals for each project are clearly identified**

- ***Value engineering***

Guide to Documenting Cost and Performance for Remediation Projects

- Purpose to standardize reporting of future remediation projects
- Provides standard terminology for
  - Site background
  - Waste characteristics
  - Treatment systems
  - Elective, fulfill requirement for remedial action reports

Cost and Performance Reports http://www.frtr.gov

Cost and Performance

Catalog of Case Studies

NEW! – 86 additional case studies added as of 11/98
NEW! – 1 additional case study added as of 2/99

Ex Situ Soil Remediation

- Composting (2 Reports)
- Incineration (16)
- Land Treatment (8)
- Slurry–Phase Bioremediation (2)
- Soil Washing (1)
- Solvent Extraction (1)
- Stabilization (1)
- Thermal Desorption (13)

Groundwater Remediation

- Air Sparging (2 Reports)
- Bioremediation (2)
- Dynamic Underground Stripping (1)
- Permeable Reactive Barriers (3)
- Pump and Treat (42)
- Steam Stripping (1)

Interagency Guide Technologies with Recommended Reporting Elements

In-Situ Ground Water Remediation

- Soil bioventing
- Soil flushing
- Soil vapor extraction
- Dual-phase extraction
- Circulating wells (UVB)
- Steam flushing
- Vertical barrier walls
- Reactive treatment walls
- In-situ oxidation
- Pump and Treat

Ex-Situ Ground Water Remediation

- Dynamic underground stripping
- Cosolvents/surfactants
- Natural attenuation of nonchlorinated compounds
- Natural attenuation of nonchlorinated hydrocarbons
- Phytoremediation

Breakdown of Cost and Performance Case Studies Media and Contaminants

	Soil	Ground Water	Debris/ Soil
Chlorinated Solvents	38	33	0
BTEX and/or TPH	21	11	0
PAHs	18	4	1
PCBs	10	4	2
Pesticides/Herbicides	8	0	0
Explosives	3	0	1
Metals	14	9	0
Radioactive	0	0	4

www.frtr.gov

200 Case Studies in 2000

Searchable by:

media, contaminant, and technology

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